

CLAIMS

1. A method for controlling transmit power for a data transmission in a
2 wireless communication system, comprising:

processing data for transmission on a power-controlled channel comprised of
4 one or more data channels, wherein each data channel is associated with a respective set
of one or more available formats, wherein each format identifies a specific set of
6 parameter values for processing data, and wherein at any given time instance a specific
format is selected for use for each of the one or more data channels from the associated
8 set of one or more available formats;

specifying a particular performance metric for each selected format for each of
10 the one or more data channels; and

transmitting the data for the one or more data channels at a particular transmit
12 power level to achieve the performance metric specified for each format selected for
use.

2. The method of claim 1, wherein the specified performance metric for
2 each selected format is a particular target block error rate (BLER).

3. The method of claim 1, wherein the specified performance metric for
2 each selected format is a particular target frame error rate (FER).

4. The method of claim 1, wherein the specified performance metric for
2 each selected format is a particular target bit error rate (BER).

5. The method of claim 1, wherein each format is further associated with a
2 respective setpoint required to achieve the specified performance metric.

6. The method of claim 5, wherein the transmit power level for the data
2 transmission is determined based on setpoints maintained for the available formats.

7. The method of claim 1, wherein the wireless communication system is a
2 W-CDMA system.

8. The method of claim 7, wherein the each data channel corresponds to a transport channel and each available format corresponds to a respective transport format.

9. The method of claim 1, wherein the wireless communication system is an IS-95 CDMA system.

10. The method of claim 1, wherein the wireless communication system is a cdma2000 system.

11. A method for controlling transmit power for a data transmission in a wireless communication system, comprising:

receiving the data transmission on a power-controlled channel comprised of one or more data channels, wherein each data channel is associated with a respective set of one or more available formats, wherein each format identifies a specific set of parameter values for processing data, and wherein at any given time instance a specific format is used for each of the one or more data channels and is selected from the associated set of one or more available formats;

determining a status of each data block received on the one or more data channels for a current time interval; and

for each format used in the current time interval, adjusting a setpoint for the format based at least in part on the status of one or more data blocks received on the data channel that uses the format, and

wherein the transmit power for the data transmission is adjusted based on a reference setpoint derived based on at least one setpoint for at least one available format.

12. The method of claim 11, wherein the setpoint for each format is a particular target signal-to-noise-plus-interference ratio (SNIR).

13. The method of claim 11, wherein the reference setpoint is derived as a particular function of the setpoints for all available formats.

14. The method of claim 11, wherein the reference setpoint is derived as the
2 maximum of the setpoints for all available formats.

15. The method of claim 11, wherein the reference setpoint is derived as a
2 maximum of the one or more setpoints for the one or more formats used in a current
time interval.

16. The method of claim 11, wherein the reference setpoint is derived as a
2 maximum of a plurality of setpoints for a plurality of formats.

17. The method of claim 11, wherein the setpoint for each available format is
2 adjusted upward if any data block in the current time interval was received in error.

18. The method of claim 11, wherein the setpoint for each format used in the
2 current time interval is adjusted upward if any data block in the current time interval
was received in error.

19. The method of claim 11, wherein the setpoint for each format used in the
2 current time interval is adjusted downward if all data blocks in the current time interval
were received without error.

20. The method of claim 11, wherein the setpoint for the format used to
2 derive the reference setpoint is adjusted downward if all data blocks in the current time
interval were received without error.

21. The method of claim 11, wherein the setpoint for each format is further
2 adjusted to achieve a particular level of performance specified for the format.

22. The method of claim 21, wherein the particular level of performance is a
2 particular target block error rate (BLER), frame error rate (FER), or bit error rate (BER).

23. The method of claim 21, wherein a single target level of performance is
2 specified for all available formats.

24. The method of claim 21, wherein a plurality of target levels of
2 performance are specified for all available formats.

25. The method of claim 11, wherein the wireless communication system is a
2 W-CDMA system, and wherein the each data channel corresponds to a transport
channel and each available format corresponds to a respective transport format.

26. The method of claim 11, wherein the wireless communication system is
2 an IS-95 or cdma2000 system.

27. An apparatus, comprising:
2 a memory; and
a digital signal process device (DSPD) communicatively coupled to the
4 memory and capable of interpreting digital information to:
direct reception of data blocks for a data transmission on a power-controlled
6 channel comprised of one or more data channels, wherein each data channel is
associated with a respective set of one or more available formats, wherein each format
8 identifies a specific set of parameter values for processing data, and wherein at any
given time instance a specific format is used for each of the one or more data channels
10 and is selected from the associated set of one or more available formats;
receive a status of each data block received on the one or more data channels for
12 a current time interval; and
adjust a setpoint for each format used in the current time interval based at least
14 in part on the status of one or more data blocks received on the data channel that uses
the format, and wherein at least one setpoint for at least one available format is used to
16 derive a reference setpoint that is further used to adjust the transmit power for the data
transmission.

28. A method for controlling transmit power for a data transmission in a
2 wireless communication system, comprising:

processing data for transmission on a power-controlled channel comprised of
 4 one or more data channels, wherein each data channel is associated with a respective set
 of one or more available formats, wherein each format identifies a specific set of
 6 parameter values for processing data, and wherein at any given time instance a specific
 format is selected for use for each of the one or more data channels from the associated
 8 set of one or more available formats;

determining a power offset associated with each of one or more formats selected
 10 for use in a current time interval for the one or more data channels; and

transmitting the data for the one or more data channels at a particular transmit
 12 power level determined based in part on one or more power offsets for the one or more
 selected formats.

29. The method of claim 28, wherein the transmit power level for the data
 2 transmission is further determined based on a reference power level.

30. The method of claim 29, wherein the reference power level is indicative
 2 of the transmit power for a reference portion included in the data transmission.

31. The method of claim 29, wherein the reference power level is indicative
 2 of the transmit power for a pilot included in the data transmission.

32. The method of claim 29, further comprising:
 2 receiving power control commands indicative of requested changes to the
 transmit power for the data transmission; and
 4 adjusting the reference power level based on the received power control
 commands.

33. The method of claim 28, wherein the transmit power level is determined
 2 based on a maximum of the one or more power offsets.

34. The method of claim 28, wherein the data for each data channel is
 2 transmitted at a respective transmit power level determined based in part on the power
 offset for the selected format.

35. The method of claim 28, further comprising:
 2 receiving updates for the one or more power offsets for the one or more selected
 formats.

36. The method of claim 28, wherein the wireless communication system is a
 2 W-CDMA system.

37. The method of claim 28, wherein the wireless communication system is
 2 an IS-95 or cdma2000 system.

38. An apparatus, comprising:
 2 a memory; and
 a digital signal process device (DSPD) communicatively coupled to the memory
 4 and capable of interpreting digital information to:
 direct processing of data for transmission on a power-controlled channel
 6 comprised of one or more data channels, wherein each data channel is associated with a
 respective set of one or more available formats, wherein each format identifies a
 8 specific set of parameter values for processing data, and wherein at any given time
 instance a specific format is selected for use for each of the one or more data channels
 10 from the associated set of one or more available formats;
 determine a power offset associated with each of one or more formats selected
 12 for use in a current time interval for the one or more data channels; and
 direct transmission of the data for the one or more data channels at a particular
 14 transmit power level determined based in part on one or more power offsets for the one
 or more selected formats.

39. A method for controlling transmit power for a data transmission in a
 2 wireless communication system, comprising:
 receiving the data transmission on a power-controlled channel comprised of one
 4 or more data channels, wherein each data channel is associated with a respective set of
 one or more available formats, wherein each format identifies a specific set of parameter
 6 values for processing data, wherein at any given time instance a specific format is used

for each of the one or more data channels and is selected from the associated set of one or more available formats, and wherein data for the one or more data channels is transmitted at a particular transmit power level determined based in part on one or more power offsets for one or more formats selected for use in a current time interval for the one or more data channels;

determining a status of each data block received in the current time interval on the one or more data channels; and

for each format used in the current time interval, updating a setpoint for the format based at least in part on the status of one or more data blocks received on the data channel that uses the format.

40. The method of claim 39, further comprising:

for each format used in the current time interval, deriving a power offset update associated with the format based at least in part on the updated setpoint and a reference setpoint.

41. The method of claim 39, further comprising:

for each format used in the current time interval, updating the power offset associated with the format based at least in part on the updated setpoint and a reference setpoint.

42. The method of claim 39, further comprising:

deriving a reference setpoint for controlling the transmit power for the data transmission.

43. The method of claim 42, further comprising:

determining signal quality of a reference portion included in the data transmission; and

deriving power control commands to adjust the transmit power for the data transmission based on the determined signal quality of the reference portion and the reference setpoint.

44. The method of claim 43, wherein the reference portion is a pilot.

2 45. The method of claim 42, wherein the reference setpoint is derived based on setpoints for all available formats.

2 46. The method of claim 42, wherein the reference setpoint is derived based on the one or more setpoints for the one or more formats used in the current time interval.

2 47. The method of claim 42, wherein the reference setpoint is derived as a maximum of a plurality of setpoints for a plurality of formats.

2 48. The method of claim 39, further comprising:
transmitting at least one update for at least one power offset for at least one format.

2 49. The method of claim 48, wherein the at least one power offset update is transmitted periodically at a particular update time interval.

2 50. The method of claim 48, wherein power offset updates for each data channel are transmitted periodically at a particular update time interval.

2 51. The method of claim 48, wherein the power offset update for each format is transmitted periodically at a particular update time interval.

2 52. The method of claim 48, wherein the at least one power offset update is transmitted upon fulfillment of one or more criteria.

2 53. The method of claim 52, wherein the one or more criteria are fulfilled if a maximum change for the at least one updated power offset exceeds a particular threshold.

2 54. The method of claim 48, wherein each power offset update is transmitted if its change from a previously transmitted value exceeds a particular threshold.

55. The method of claim 39, wherein the wireless communication system is a W-CDMA system.

56. The method of claim 39, wherein the wireless communication system is an IS-95 or cdma2000 system.

57. An apparatus, comprising:
a memory; and
a digital signal process device (DSPD) communicatively coupled to the memory and capable of interpreting digital information to:

direct reception of data blocks for a data transmission on a power-controlled channel comprised of one or more data channels, wherein each data channel is associated with a respective set of one or more available formats, wherein each format identifies a specific set of parameter values for processing data, wherein at any given time instance a specific format is used for each of the one or more data channels and is selected from the associated set of one or more available formats, and wherein data for the one or more data channels is transmitted at a particular transmit power level determined based in part on one or more power offsets for one or more formats selected for use in a current time interval for the one or more data channels;

receive a status of each data block received in the current time interval on the one or more data channels;

update a setpoint for each format used in the current time interval based on the status of one or more data blocks received on the data channel that uses the format; and

derive a power offset update for each format used for the data transmission based on the setpoint for the format and a reference setpoint.

58. A method for reporting performance of a data transmission in a wireless communication system, comprising:

receiving the data transmission on a power-controlled channel comprised of one or more data channels, wherein each data channel is associated with a respective set of one or more available formats, wherein each format identifies a specific set of parameter values for processing data, and wherein at any given time instance a specific format is

selected for use for each of the one or more data channels from the associated set of one
8 or more available formats;

determining a status of each data block received on the one or more data
10 channels; and

reporting a value for a particular number of data blocks received correctly within
12 a particular time window as indicative of the performance of the data transmission.

59. The method of claim 58, wherein the data transmission is a downlink
2 transmission from a base station to a terminal in a CDMA communication system.

60. The method of claim 58, wherein the data transmission is an uplink
2 transmission from a terminal to a base station in a CDMA communication system.

61. A power control unit in a wireless communication system, comprising:
2 a first power control loop operative to receive an indication of a signal quality of
a received data transmission and a reference setpoint, and to derive power control
4 commands based on the indicated signal quality and the reference setpoint; and
a second power control loop coupled to the first power control loop and
6 operative to receive status of one or more data blocks in the data transmission and to
adjust a setpoint for each of one or more formats used for the data transmission, and
8 wherein the one or more formats are selected from among a plurality of available
formats, and
10 wherein the reference setpoint is derived based on at least one setpoint for at
least one available format.

62. The power control unit of claim 61, wherein each available format is
2 associated with a respective setpoint.

63. The power control unit of claim 61, wherein each available format is
2 associated with a respective target block error rate (BLER).

64. The power control unit of claim 61, wherein each available format is associated with a respective power offset indicative of the transmit power to be used for the format relative to a reference power level.

65. The power control unit of claim 64, further comprising:
a third power control loop coupled to the second loop and operative to provide a transmitter with the power offset or a power offset update for each of the one or more formats used for the data transmission.

66. An apparatus for controlling transmit power in a wireless communication system, comprising:

means for receiving an indication of a signal quality of a received data transmission and a reference setpoint, and to derive power control commands based on the indicated signal quality and the reference setpoint; and

means for receiving status of one or more data blocks in the data transmission and to adjust a setpoint for each of one or more formats used for the data transmission, wherein the one or more formats are selected from among a plurality of available formats, and wherein the reference setpoint is derived based on at least one setpoint for at least one available format.

67. The apparatus of claim 66, further comprising:
means for providing a transmitter with a power offset or a power offset update for each of the one or more formats used for the data transmission.

68. A power control unit for use in a wireless communication system, comprising:

a signal quality measurement unit operative to receive and process a data transmission to determine a signal quality of the data transmission;

a receive data processor operative to process the data transmission to determine status of one or more data blocks received in a current time interval from the data transmission; and

a power control processor coupled to the signal quality measurement unit and operative to

10 receive the determined signal quality and derive power control
 commands based on the determined signal quality and a reference setpoint,
 12 receive the status of the one or more data blocks for the current time
 interval and adjust a setpoint for each of one or more formats used in the current
 14 time interval for the data transmission, wherein the one or more formats are
 selected from among a plurality of available formats, and
 16 derive the reference setpoint based on at least one setpoint for at least
 one transport available format.

69. The power control unit of claim 68, wherein the power control processor
 2 is further operative to
 maintain a power offset for each of the one or more formats used in the
 4 current time interval for the data transmission.

70. An apparatus for controlling transmit power in a wireless communication
 2 system, comprising:
 means for receiving and processing a data transmission to determine a signal
 4 quality of the data transmission;
 means for processing the data transmission to determine status of one or more
 6 data blocks received in a current time interval from the data transmission;
 means for receiving the determined signal quality and deriving power control
 8 commands based on the determined signal quality and a reference setpoint;
 means for receiving the status of the one or more data blocks for the current time
 10 interval and adjusting a setpoint for each of one or more formats used in the current time
 interval for the data transmission, wherein the one or more formats are selected from
 12 among a plurality of available formats; and
 means for deriving the reference setpoint based on at least one setpoint for at
 14 least one transport available format.

71. The apparatus of claim 70, further comprising:
 2 means for deriving a power offset or a power offset update for each of the one or
 more formats used in the current time interval for the data transmission.